Water Quality and Other Expected Benefits

The Project will result in water quality, ecosystem, and aesthetic/recreational benefits. The Town was unable to quantify these benefits can only be measured subjectively or because the Town does not have adequate data available at this time.

Water Quality Benefits:

Although Trout Creek itself has not been reported as impaired by the State Water Resources Board (http://www.swrcb.ca.gov/tmdl/docs/2002reg6303dlist.pdf), it is tributary to the Truckee River, which has been listed as impaired due to sedimentation/siltation. Trout Creek contributes to that impairment. Inspection of Reaches 2-5 shows accumulations of sand on the channel bed. The existing condition of the channel reflects the cumulative impact of at least 50 years of the application of road sand.

Although fine sediment occurs naturally in all stream systems, an excess of fine sediment that is chronically delivered to the stream channel can be problematic in terms of its impact on aquatic resources. Sources of fine sediment include road abrasives, excessive bank erosion, gully erosion associated with runoff from impervious surfaces, channel incision in headwater streams, and road cuts and shoulders.

Control of fine sediment sources and management of fine sediment once it reaches waterways is a complicated issue that requires a comprehensive approach. The primary approach is source control and stormwater management BMP's that can be implemented neighborhood by neighborhood. The second approach, which is implemented with this project, is to restore stream function so that the chronically delivered fine sediment is flushed through the system, is stored on floodplains via annual overbank events (floodplain restoration), or is sorted from spawning beds and pools via channel complexity and variability in flow fields. By integrating each of these approaches into an effective strategy for fine sediment management, significant improvements can be made to the quality of aquatic habitat.

Vegetation along the creek corridor will include a sedge meadow community that is dominated by herbaceous wetland species interspersed with willows to provide structural diversity and additional bank stability. This vegetation also provides a water quality benefit when the meadows flood seasonally by uptaking nutrients and encouraging fine sediment deposition on the floodplain. The sedge meadow community will form large portions of the floodplain with shallow slope areas in Reaches 4 and 5.

The quantity of woody material within a stream system not only improves cover habitat, wood stores sediment in the channel, creates variability in flow and velocity vectors, scours pools, and encourages sorting of bed load material. The project incorporates large woody debris/logs, which will be partially buried in the stream channel.

Ecosystem Restoration Benefits:

Existing Conditions

Fish

In 2002, Phillip Williams Associates characterized fish habitat quality within the project reach as ranging from fair to excellent with the best habitat occurring in upper Reach 1 and portions of Reach 5. The habitat quality was summarized as follows:

- Lacking in cover habitat from large rocks, woody debris, or undercut banks,
- Poor substrate diversity with many areas buried by fine sediment, and
- Well vegetated banks through most areas though lacking in overhanging vegetation.

Wildlife

Wildlife species, both avian and terrestrial, are attracted to riparian areas because they may be the only source of water in late summer, provide cover and shade habitat on warm days, and attract prey species. The biological resources assessment prepared for the Trout Creek project area (Northfork,2007) summarizes common, as well as special status wildlife species that either may occur, or were observed, in November 2006. The observed species include a variety of birds, including killdeer (Charadrius vociferus), belted kingfisher (Ceryle alcyon), hairy woodpecker (Picoides villosus), Stellar's jay (Cyanocitta stelleri), common raven (Corvus corax), mountain chickadee (Poecile gambeli), white-breasted nuthatch (Sitta carolinensis), brown creeper (Certhia americana), and dark-eyed junco (Junco hyemalis) and several mammals, including California ground squirrel (Spermophilys beecheyi), American beaver (Castor canadensis), raccoon (Procyon lotor), and mule deer (Odocoileus hemionus).

In addition to the observed wildlife species, listed special status species include mountain yellowlegged frog (Rana mucosa), Copper's hawk (Accipiter cooperi), northern goshawk (Accipiter gentilis), yellow warbler (Dendroica petechia brewsteri), willow flycatcher (Empidonax traillii), bald eagle (Haliaeetus leucocephalus), and osprey (pandion haliaetus). Of the special status species listed, those that may possibly occur on site include the mountain yellow-legged frog and the yellow warbler. For all of the other special status species, adequate habitat, given current conditions, does not exist on site to support their presence.The main objectives of the ecosystem restoration approach is to develop a continuous corridor of overstory riparian vegetation, create a mosaic of riparian and ecotone (transitional) habitats with diverse species composition and structure, and provide opportunities for the riparian community to regenerate and support enhanced habitat conditions for fish and wildlife species. The riparian restoration areas are designed to be resilient to perturbations (e.g., flood or drought) and self-sustaining after the initial establishment and maintenance period.

Proposed Conditions

Although lower Trout Creek provides habitat for fish and wildlife species, habitat conditions could be significantly improved through restoration of important habitat elements such as:

- Improved Cover Habitat: Fish and amphibians rely on escape cover to avoid predation. Escape cover includes large and small woody material, boulders, undercut banks, and

aquatic and terrestrial vegetation. Existing conditions in Trout Creek provides some cover habitat in the form of undercut banks and terrestrial vegetation, but it lacks the complexity to support a diversity of habitat types.

- Off-channel Habitat: The current Trout Creek channel lacks off channel habitat such as secondary channels that provide refuge for fish under high flow conditions, off-channel wetlands that provide breeding and rearing habitat for amphibians, and backwater areas that provide rearing habitat for juvenile fish.

- Hydraulic Complexity: The existing channel lacks the variability of velocity and flow fields to create diverse habitat conditions and to sort fine sediment from other grain sizes, such as gravels, that trout rely on during certain phases of their life cycle.

A restored Trout Creek channel can incorporate each of these habitat elements by creating an appropriately sized channel, varying channel types through the project reach via changes in slope, width to depth ratios, and sinuosity, incorporating secondary high flow channels and off-channel wetlands on the floodplain that flood seasonally, but are also in contact with shallow groundwater, and installing habitat enhancing large wood structures. Wildlife species, both avian and terrestrial, are also attracted to riparian areas because they may be the only source of water in late summer, provide cover and shade habitat on warm days, and attract prey species. Therefore, vegetation diversity and a wider riparian corridor will also improve habitat conditions in floodplain areas that are non-existent under current conditions.

Recreational and Aesthetic Benefits:

The project will significantly improve the aesthetics of the creek. The creek will be restored to a natural state and will have improved vegetation. The current plan for the adjacent Railyard Master Plan Development is to construct a pedestrian/bicycle trail adjacent to the creek in Reach 4.

The general public will benefit from the water quality, aesthetic improvements, and improvement of ecological function. These benefits will also have a positive impact on the Truckee River. The Truckee River, which travels through two states, provides 85 percent of the drinking water to Reno, Nevada. The Truckee River and its tributaries (like Trout Creek) have regional significance.

Fish and wildlife in the Trout Creek and Truckee River corridors also benefit from the project.

The ecological benefits of the project may take a few years to realize because the vegetation must be established before habitat is created.